

newly exposed surface of the molten substratum again solidified, a fresh crust, of greater density than before, would be formed out of the heavy substratum over the middle of the area, where the hollow had been made, and also in the channels between the fragments which had floated towards it; the Atlantic being the chief of these channels."

In his paper on "The Place of Origin of the Moon—The Volcanic Problem" (*Journ. Geol.*, 1907, vol. 15, p. 23) W. H. Pickering elaborates the view previously propounded by Osmond Fisher; and although he makes no acknowledgment, we may safely infer that, directly or indirectly, he owed the idea to Fisher. The following quotation shows how remarkably close Pickering got to the statement of the Wegener hypothesis: "A curious feature of the Atlantic Ocean is that the two sides have in places a strong similarity. . . . When the moon separated from the earth, three-fourths of the crust was carried away, and it is suggested that the remainder was torn in two to form the eastern and western continents. These floated on the liquid surface like two large ice-floes."

In his paper on the "Bearing of the Tertiary Mountain Belt on the Origin of the Earth's Plan" (*Bull. Geol. Soc. America*, 1910, vol. 21, p. 179) F. B. Taylor remarks: "Thus we may conclude, at least provisionally, that it was North America that moved away from Greenland, and not *vice versa*."

If the view that the American continent has drifted away from Europe and Africa during Mesozoic and Tertiary times comes to be established, which seems highly improbable, it will no doubt owe much to Wegener, and will be associated with his name in this special sense; but Osmond Fisher is clearly the author of the hypothesis of continental drift, so far as it applies to the problem of the origin of the Atlantic Ocean. The tectonic evidence provided by a study of the Atlantic floor, however, indicates that its submergence in large part during Tertiary times has been effected by the ordinary process of subsidence, and that, *pari passu* with this subsidence, considerable areas of Eurasia and Africa, which were previously submerged, have been raised above sea-level. Indeed, as Suess has pointed out, the evidence seems to show quite conclusively that, throughout the Mesozoic and Tertiary eras, a mediterranean ocean of the Atlantic type has in a large way dissected the continental masses and absorbed their drainage, although its orientation has changed.

These broad geotectonic considerations seem to be utterly at variance with the claim based by Wegener on the jig-saw relationship of the opposite sides of the Atlantic; and there can be little doubt that, to a large extent, they dispose also of the Fisher hypothesis of continental drift, so far as the origin of the Atlantic is concerned.

It should be remembered, however, that Fisher's views on continental drift were based on the hypothesis he entertained as to the condition of the earth's interior. There are profound differences between the Atlantic and Pacific Oceans. Astronomers tell us that the Fisher hypothesis as regards the Pacific is a very good one, and to this may be added the claim that, in large measure, it fits the facts known to us concerning the petrology and tectonics of the earth. While, therefore, declining to accept Fisher's hypothesis of continental drift to explain the origin of the Atlantic, we may accept provisionally his view that the Pacific owes its origin to the detachment of the moon, especially as some hypothesis seems to be necessary to explain the heterogeneity of the earth's crust.

T. CROOK.

Aster tripolium on Salt Marshes.

I NOTICE in the article on Belgian botany in NATURE of January 20, p. 97, a statement which reminds me of some observations of mine at Dovercourt, near Harwich, in 1908. The article says that a fringe of the purple-rayed form of *Aster tripolium* occurs between the salt marshes, occupied by the yellow form, and the more fertile, less saline, soil. At Dovercourt there are fields overflowed by the sea at every high tide, but still showing signs of former cultivation. The specimens of *Aster* growing here were all fleshy and rayless. Separated from these fields by earthen dykes were other fields, which showed no signs of being flooded at any time. Here the *Aster* was always thin and wiry in the stalk, and bore a well-developed ray.

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January 31.

The Cause of Anticyclones.

WITH reference to Miss Catherine O. Stevens' letter (NATURE, February 3, p. 150) on this subject, it is clear that there could be no high-pressure areas unless there were low-pressure areas as well.

It is also quite clear that the pressure distribution at any moment depends upon the flow of the winds, the inertia of the air, and the rotation of the earth. But the atmosphere is a viscous substance, and the friction resulting from its viscosity would soon bring the whole mass to rest were there no continuous source of power to keep it moving.

It is generally agreed that the source of power which maintains the circulation of the atmosphere is difference of air density resulting from difference of temperature. The problems to be solved are—what is the exact distribution of temperature throughout the atmosphere? will the actual temperature distribution account for the winds? and how are these temperature differences maintained?

R. M. DEELEY.

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February 2.

The High Temperature of the Upper Atmosphere.

IN a letter in NATURE of February 10 Mr. Whipple suggests that a comparatively sudden increase in temperature of the air at a height of about 60 kilometres, such as observations of meteors render likely, would account for the well-known zones of audibility and silence. This seems to us a promising line of investigation, which might enable one to determine annual variations of temperature, if any. We had already examined the possibility of using meteor observations for this purpose, but they are as yet scarcely sufficiently accurate to enable one to determine the small differences involved. The same applies to the suggestion of Mr. Deeley in NATURE of January 20.

In the last paragraph of his letter Mr. Whipple suggests that the estimates which we made of the temperature on theoretical grounds require modification, as the atmosphere is exposed to the sun only during the day-time. We need scarcely point out that this fact had not escaped our attention and was allowed for in the coefficients of the formula actually used.

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GORDON M. B. DOBSON.
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February 12.